

APPENDICES

APPENDICES

APPENDIX A / Error Messages

There are three kinds of error messages you might get while using your Computer:

- . Boot Errors, such as "BOOT ERROR DC." See the BOOT ERRORS TABLE for more information.
- . Operating System Errors, such as "ERROR 24" or "FILE NOT FOUND." To get a brief description of a numbered error, type "ERROR" followed by the error number displayed. For example, type:

ERROR 31 <ENTER>

and your screen will show:

PROGRAM NOT FOUND

For more information, see the SYSTEM ERRORS TABLE.

- . Application Program Errors -- see your application program manual.

When an error message is displayed:

- . Try the operation several times.
- . Look up boot errors and operating system errors in the following tables and take the recommended actions. See your application program manual for explanations of application program errors.
- . Try using other diskettes.
- . Reset the Computer and try the operation again.
- . Check all the power connections.
- . Check all interconnections.
- . Remove all diskettes from drives, turn off the Computer, wait 15 seconds, and turn it on again.
- . If you try all these remedies and still get an error message, contact a Radio Shack Service Center.

Note: If there is more than one thing wrong, the Computer might wait until you correct the first error before displaying the second error message.

RSSC = Radio Shack Service Center

SYSTEM ERRORS TABLE

Error Code	Description	Explanation/Action
6	Attempt to open a file which hasn't been closed.	Close file before re-opening.
28	Attempt to read past end of file.	Record Number specified is past the EOF.
34	Attempt to use a non program file as a program.	File specified for execution is not a program file or an illegal load address was given.
133	Bad CRT number.	For multi-user only.
1	Bad function code on SVC call or no function exists.	Check function code number used on an SVC call.
132	Bad partition number.	For multi-user only.
129	Bad SVC-Block format.	Check format of SVC-block for errors.
	BOOT ERROR	See BOOT ERROR TABLE
4	CRC error during disk I/O (input/output) operation.	Try operation again, using a different diskette. If problem occurs frequently call RSSC.
2	Character not available.	No record or character was available when the SVC was called.
16	DCB is modified and is unusable.	DCB (used in machine-language programming) has been modified since last disk access (while the file was open).

Error Code	Description	Explanation/Action
41	Data lost during disk I/O (input/output). Hardware fault.	Contact a Radio Shack Service Center.
135	Debug Not Configured.	Include Debug at configuration time.
136	Device not available.	Device already assigned For multi-user only.
137	Device Unassigned.	For multi-user only.
17	Directory read error.	Error occurred while trying to read directory. Use a different diskette.
26	Directory space full.	Number of filenames exceed the amount set when diskette was formatted.
18	Directory write error.	Error occurred while trying to write to the directory. Use a different diskette.
33	Disk space allocation can't be made because of fragmentation of space. (not used on TRSDOS-II)	Use a different diskette or copy files to a clean diskette to reduce fragmentation.
27	Disk space full.	No available space on diskette.
8	Disk drive not ready.	Drive door open or diskette not in drive. On thinline drives, use TRSDOS-II, TRSDOS-16, or patched version of TRSDOS 2.0b.

Error Code	Description	Explanation/Action
15	Disk is write protected.	Use a diskette with a write-enable tab on it.
5	Disk sector not found.	Try a different diskette.
128	DO-Nesting not allowed.	A 'DO' command was encountered within a DO file.
25	File access denied due to password protection.	Incorrect password given for protection level -- See ATTRIB in the Model 16 Owner's Manual.
11	File already in directory.	Filename already exists as a directory entry. Kill existing file or choose another filename.
24	File not found.	Filename given not found on available diskettes or file is incorrect type for desired operation.
49	Hardware fault during disk I/O (input/output).	Contact a Radio Shack Service Center.
38	I/O (input/output) attempt to an unopen file.	Open file before access.
39	Illegal I/O (input/output) attempt.	On Thinline drives -- use patched version of TRSDOS. Can be caused by an I/O attempt to a differently formatted diskette. Format diskette under current version of TRSDOS or use FCOPY.

Error Code	Description	Explanation/Action
131	Illegal Address.	SVC block or SVC argument is not within the memory range.
138	Illegal device name.	Device name specified for ASSIGN not valid.
7	Illegal disk change.	The system detected an illegal disk swap.
144	Illegal File Type	File type used is not the type required by the system (VLR or FLR).
134	Illegal operation	For multi-user only.
19	Improper file name (filespec).	Filespec given does not meet TRSDOS standard file specifications.
48	Incorrect command parameter.	Option or argument given in command is incorrect.
9	Invalid data provided by caller.	Data stream to be processed has illegal characters.
50	Invalid Space Descriptor.	Try a different diskette.
10	Maximum of 16 files may be open at once.	Too many files opened at one time.
35	Memory fault during program load.	Program not loaded correctly, possibly because of faulty memory or because a bad load address was given.
12	No drive available for an open.	No on-line drive is: a) write enabled or b) has enough space to create a new file.

Error Code	Description	Explanation/Action
Ø	No error found.	No error occurred.
3Ø	No more extents available (16 maximum). (not used on TRSDOS-II)	Data on diskette too fragmented, copy files to a clean diskette.
46	Not applicable to VLR type files.	Operation performed not valid for VLR files.
2Ø	Not Used.	
21	Not Used.	
22	Not Used.	
23	Not Used.	
13Ø	Odd address.	Address required by SVC block must be even.
37	Open attempt for a file already open.	File specified for open is already open.
3	Parameter error on call.	Parameter incorrect or required parameter (option) missing.
36	Parameter for open is incorrect.	Check OPEN statements or DCB for errors.
31	Program not found.	Program specified not found on available volumes.
44	Printer fault (may be turned OFF).	Check connections, power, ribbon, etc.
45	Printer not available.	Check connections, power, ribbon, etc.

Error Code	Description	Explanation/Action
42	Printer not ready.	Check connections, power, ribbon, etc.
43	Printer out of paper.	Check printer's paper supply.
29	Read attempt outside of file limits.	Use valid record numbers.
47	Required command parameter not found.	Required option or argument missing in command.
40	SEEK error.	Data cannot be read from diskette -- faulty media. Try a different diskette.
140	Undefined	
141	Undefined	
142	Undefined	
32	Unknown drive number (filespec).	Drive number specified not a valid drive number.
51-127	Unknown Error Codes.	
139	User Stack Overflow	Overflow occurred in user stack during SETBRK SVC or SETTRP SVC operation.
13	Write attempt to a read only file.	File was opened for read only, not read/write.
14	Write fault on disk I/O (input/output).	Error occurred during a write operation -- try a different diskette. If problem continues - RSSC.
143	SVC Table Overflow	For multi-user only.

BOOT ERROR TABLE

Error Code	Description	Explanation/Action
BOOT ERROR CK	Defective ROM (Checksum Error)	Contact a Radio Shack Service Center
BOOT ERROR CT	Defective CTC Chip	Contact a Radio Shack Service Center
BOOT ERROR DC	1. Defective diskette. 2. Floppy disk expansion unit not on. 3. Defective FDC Chip or Drive.	1. Try a different diskette. 2. Turn on floppy disk expansion unit. 3. Contact a Radio Shack Service Center.
BOOT ERROR DM	Defective DMA Chip	Contact a Radio Shack Service Center
BOOT ERROR DØ	Drive not ready. 1. Improperly inserted diskette. 2. Defective diskette. 3. Defective drive.	1. Insert diskette again and reset the Computer. 2. Try a different diskette. 3. Contact a Radio Shack Service Center.
BOOT ERROR HA	Controller Error. Aborted command: Problem during boot-up of hard disk.	Re-initialize hard disk or contact a Radio Shack Service Center.
BOOT ERROR HC	CRC Error. Invalid data in data field.	Re-initialize hard disk or contact a Radio Shack Service Center.

Error Code	Description	Explanation/Action
BOOT ERROR HD	Controller Error. Busy not reset.	Re-initialize hard disk or contact a Radio Shack Service Center.
BOOT ERROR HI	CRC Error. Invalid data in ID field.	Re-initialize hard disk.
BOOT ERROR HM	Data address mark not found.	Re-initialize hard disk
BOOT ERROR HN	ID not found. No Boot Track.	Re-initialize hard disk
BOOT ERROR HØ	Track Ø Error on hard disk 1. Didn't find Track Ø before time-out. 2. Secondary hard disk drives not turned on	1. Reset the Computer 2. Turn on your secondary hard disk drives
BOOT ERROR HT	Time-out while waiting for READY. 1. Hard disk drive not powered up. 2. Hard Disk Drive isn't turned ON and ready within 1Ø seconds after Computer. 3. Hard Disk Drive is disconnected.	1. Follow correct power up procedure: turn on hard disk first. 2. Reset the Computer 3. Connect the hard disk drive or operate under floppy disk control

TRS-80®

Error Code	Description	Explanation/Action
=====	=====	=====
BOOT ERROR LD	Lost Data during read -- FDC (Floppy Disk Controller) or Drive fault.	Try another TRSDOS diskette or contact a Radio Shack Service Center.
-----	-----	-----
BOOT ERROR MF	Defective RAM in address range H'1000'-H'7FFF'.	Contact a Radio Shack Service Center.
-----	-----	-----
BOOT ERROR MH	Defective RAM in address range H'8000'-H'FFFF'. (64K Computers only)	Contact a Radio Shack Service Center.
-----	-----	-----
BOOT ERROR ML	Defective RAM in address range H'0000'-H'0FFF'.	RSSC
-----	-----	-----
BOOT ERROR PI	Defective PIO Chip	RSSC
-----	-----	-----
BOOT ERROR RS	The diskette in Drive 0 is not Radio Shack Model 16 or Model II Operating System format.	1. Insert a TRSDOS, TRSDOS-II or TRSDOS-16 formatted diskette into Drive 0 and reset the Computer. 2. Remove diskettes and turn power off. Wait 15 seconds and turn on the system again.
-----	-----	-----
BOOT ERROR SC	CRC Error. Invalid data on diskette or defective diskette.	Try a different diskette.
=====	=====	=====

Error Code	Description	Explanation/Action
=====		
BOOT ERROR TK	Record not found on bootstrap track. Improperly formatted or defective diskette.	Re-format your diskette or try a different diskette.

BOOT ERROR Z8 (68000 Memory Fault at Page Address=xxxxxxx)	Defective CPU. Memory Fault. xxxxxx is the hex addr of 1K block where fault occurred.	RSSC. RSSC

NOT A SYSTEM DISK	Diskette in Drive 0 isn't a TRSDOS, TRSDOS-II or TRSDOS-16 Operating System Diskette	Insert a TRSDOS, TRSDOS-II, or TRSDOS-16 Operating System diskette into Drive 0
=====		

APPENDIX B / The Configuration Command File

Whenever TRSDOS-16 starts up or is reset, it looks for a file named CONFIG16/SYS. This "configuration command file" tells TRSDOS-16 to link in certain extra operating system programs.

CONFIG16/SYS should be present on the primary disk device (Drive 0 or Drive 4). It contains these directives:

```
INCLUDE RUNCOBOL
INCLUDE DEBUG
END
```

which tell TRSDOS-16 to link in the RUNCOBOL program and the DEBUG program.

You may create your own CONFIG16/SYS file, or modify the existing one to meet your needs, by using EDIT16.

The CONFIG16/SYS file on your TRSDOS-16 diskette does not include the RUNCOBOL file as stated.

SAVING THE EXISTING CONFIG16/SYS FILE

Before creating a new CONFIG16/SYS file, you will probably want to save the existing one by renaming it.

For example:

```
RENAME CONFIG16/SYS:0 TO DEBCOB/CFG:0
```

renames the default configuration file. (The new filename tells you it includes both DEBUG and RUNCOBOL modules.

After renaming the existing CONFIG16/SYS file, you can create a new one.

Since you "saved" the existing file, you can use it again. To do this, rename the present CONFIG16/SYS file (if you want to save it) and then rename DEBCOB/CFG back to CONFIG16/SYS:

```
RENAME DEBCOB/CFG:0 TO CONFIG16/SYS:0
```

TO EDIT OR CREATE CONFIG16/SYS

Use EDIT16 to edit or create a CONFIG16 command file.

1. Type:

EDIT16 <ENTER>

and the Editor's Command mode prompt will be displayed:

C?.....

2. To insert commands into the command file, you must get in the Insert mode, type:

IN <ENTER>

The Editor will display the I? prompt, indicating that you are in the Insert mode.

3. You are now ready to insert the names of the programs you want linked to TRSDOS-16.

Comments may be used. They are indicated by an asterisk (*) in the first column.

The key word **INCLUDE** tells TRSDOS-16 the name of the program. The syntax for the **INCLUDE** statement is:

INCLUDE filename

The default extension for filespec is **/SYS**; it is optional. Drive numbers, disk ID and Passwords are not permitted.

Programs are loaded sequentially in memory in the order they are encountered in the CONFIG16/SYS file. The maximum number of programs that may be **INCLUDEd** is 15.

The programs must be resident on the primary drive (Drive 0 or Drive 4).

The list is concluded with an **END** statement.

For example:

```
* This is the Configuration File for DEBUG
INCLUDE DEBUG
END
```

tells TRSDOS-16 to link only the DEBUG program. The first line is a comment and is not executed by TRSDOS-16

4. When you are finished inserting, press <ENTER> to exit the Insert Mode.

5. Save the file with the following command:

```
SA CONFIG16/SYS <ENTER>
```

6. You now have a new CONFIG16 command file that TRSDOS-16 will use when it powers up or resets.

CONFIGURATOR ERROR MESSAGES

When the Configurator lists a line generating an error, it prints an error message directly underneath the line number. Preceding the message, it inserts three asterisks.

In cases of certain syntax or file I/O errors, the Configurator also marks, with a dollar sign (\$), where in the line the error occurred.

For example:

```
Ø11 INCLUDE RUNCOBOL
    $
*** Illegal Command
```

shows a syntax error in the spelling of INCLUDE.

There are three catagories of Configurator error messages:

- A. Configuration Control File Errors
- B. Configuration Command Errors
- C. Completion Errors

A. Configuration Control File Errors

These errors are FATAL. If one of these errors occur, the Configurator could not properly execute the CONFIG16/SYS file. TRSDOS-16 will still be displayed but certain defaults will have occurred:

1. No programs have been INCLUDED
2. DEBUG is kept resident (if available)
3. Any memory not occupied by DEBUG and the resident Operating System is available to the user.

Use EDIT16 to correct the error (or create a new configuration file) and reset the system.

Can't Open CONFIG16/SYS: TRSDOS Error Code = nnn

Look up TRSDOS-16 Error Code nnn in Appendix B and take appropriate action.

Can't configure system: File CONFIG16/SYS not proper format

The CONFIG16/SYS file is not a VLR type file.

Can't configure system: File CONFIG16/SYS not found

TRSDOS-16 could not find the CONFIG16/SYS file.

I/O Error on File CONFIG16/SYS: TRSDOS Error Code = nnn

Look up TRSDOS-16 Error Code nnn in Appendix B and take appropriate action.

B. Configuration Command Errors

These errors occur when a command cannot be processed by the Configurator. If one of these error occurs, the Configurator will continue to process the command lines. However, the desired result of the configuration file may not have been accomplished. For example, an INCLUDE file may have been left out.

Can't INCLUDE program: TRSDOS Error Code = nnn

The Configurator cannot load the program because of an I/O error. Look up the TRSDOS-16 Error Code in Appendix B.

Can't INCLUDE program: Out of Memory

More resident programs were requested than will fit into user memory.

Can't INCLUDE program: Program already configured

This error occurs any time a program is included twice.

Too many INCLUDED programs: this request ignored

This error occurs if more than 15 programs are included. The command line that is flagged is ignored (treated as a comment).

C. Completion Error

*** CONFIGURATION ABORTED ***

This message appears when the configurator could not finish processing the CONFIG16/SYS file because of an I/O error.

ABOUT THE CONFIGURATOR

The Configurator is invoked whenever the 68000 processor is initialized. It performs several important functions:

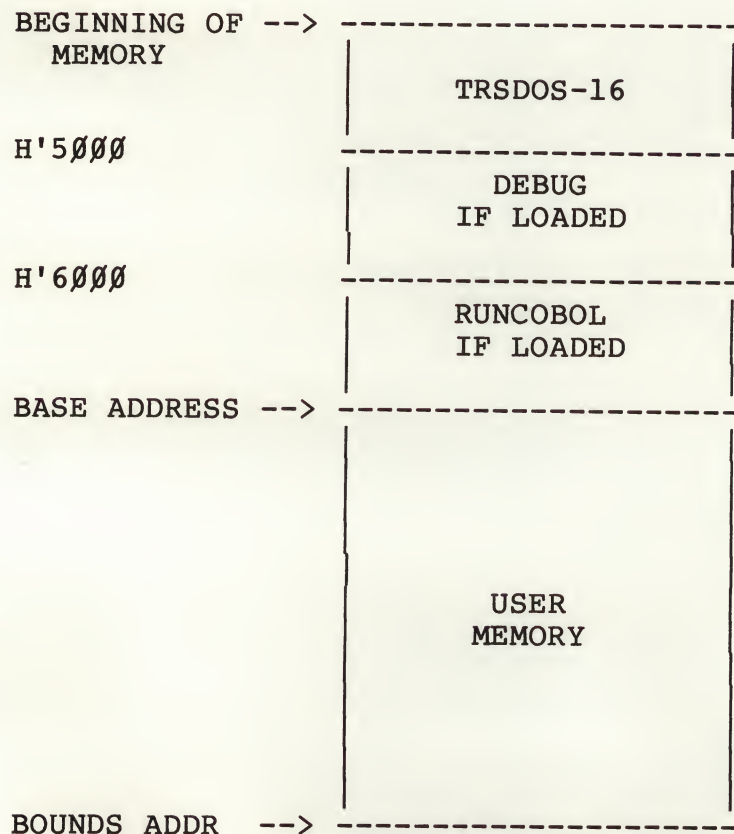
- . It determines whether the machine debugger is required. If not, it is eliminated from memory. This gives you an extra 4K of memory.
- . It initializes traps and interrupts. This eliminates the need to keep extra code resident in memory.
- . It loads in resident programs as specified in the CONFIG16/SYS file.
- . It reads the AUTO file and passes it to TRSDOS-16 for execution.

The Configurator is linked in at the end of user memory and occupies 4K of memory. Upon system initialization, it moves itself to the top of physical memory. This is because the resident programs will be loaded at low address, overlaying the original configurator.

Next the Configurator begins to load the resident programs requested in the CONFIG16/SYS file (i.e., DEBUG and RUNCOBOL). It loads these programs sequentially starting at the beginning of user memory and up to the beginning of where the Configurator has relocated itself. This guarantees that after loading is complete, the user has at least 4K of memory available (the size of the Configurator).

After configuration is complete, the Configurator is no longer necessary and is overwritten.

APPENDIX C / Memory Map



MEMORY CHART

User memory begins at H'50000 if the Debugger is not configured and at H'60000 if the Debugger is configured.

APPENDIX D / ASCII Character Codes

Code		Character	
Dec.	Hex.	Keyboard	Video Display
00	00	HOLD	
01	01	F1 CTRL A	Turns on blinking cursor
02	02	F2 CTRL B	Turns off cursor
03	03	BREAK CTRL C	
04	04	CTRL D	Turns on steady cursor
05	05	CTRL E	
06	06	CTRL F	
07	07	CTRL G	
08	08	BACKSPACE CTRL H	Backspaces cursor and erases character
09	09	TAB CTRL I	Advances cursor to next 8-character boundary
10	0A	CTRL J	Line feed
11	0B	CTRL K	Cursor to previous line
12	0C	CTRL L	
13	0D	ENTER CTRL M	Carriage return
14	0E	CTRL N	Dual routing on
15	0F	CTRL O	Dual routing off
16	10	CTRL P	
17	11	CTRL Q	
18	12	CTRL R	
19	13	CTRL S	
20	14	CTRL T	Homes cursor to upper left
21	15	CTRL U	
22	16	CTRL V	
23	17	CTRL W	Erases to end of line
24	18	CTRL X	Erases to end of screen
25	19	CTRL Y	Sets white-on-black mode
26	1A	CTRL Z	Sets black-on-white mode
27	1B	ESC	Clears screen, homes cursor

* **BREAK** is always intercepted. It will never return a code 3 to the user program.

Code		Character	
Dec.	Hex.	Keyboard	Video Display
28	1C	←	Moves cursor back
29	1D	→	Moves cursor forward
30	1E	↑	Sets 80-character mode and clears Display
31	1F	↓	Sets 40-character mode and clears Display
32	20	SPACE BAR	Ø
33	21	!	!
34	22	"	"
35	23	#	#
36	24	\$	\$
37	25	%	%
38	26	&	&
39	27	'	'
40	28	((
41	29))
42	2A	*	*
43	2B	+	+
44	2C	,	,
45	2D	-	-
46	2E	.	.
47	2F	/	/
48	30	Ø	Ø
49	31	1	1
50	32	2	2
51	33	3	3
52	34	4	4
53	35	5	5
54	36	6	6
55	37	7	7
56	38	8	8
57	39	9	9
58	3A	:	:
59	3B	;	;
60	3C	<	<
61	3D	=	=
62	3E	>	>
63	3F	?	?
64	40	@	@
65	41	A	A
66	42	B	B
67	43	C	C
68	44	D	D
69	45	E	E
70	46	F	F
71	47	G	G

Code		Character	
Dec.	Hex.	Keyboard	Video Display
72	48	H	H
73	49	I	I
74	4A	J	J
75	4B	K	K
76	4C	L	L
77	4D	M	M
78	4E	N	N
79	4F	O	O
80	50	P	P
81	51	Q	Q
82	52	R	R
83	53	S	S
84	54	T	T
85	55	U	U
86	56	V	V
87	57	W	W
88	58	X	X
89	59	Y	Y
90	5A	Z	Z
91	5B	[[
92	5C	CTRL-9	\
93	5D]]
94	5E	^	^
95	5F	-	-
96	60		`
97	61	A	a
98	62	B	b
99	63	C	c
100	64	D	d
101	65	E	e
102	66	F	f
103	67	G	g
104	68	H	h
105	69	I	i
106	6A	J	j
107	6B	K	k
108	6C	L	l
109	6D	M	m
110	6E	N	n
111	6F	O	o
112	70	P	p
113	71	Q	q
114	72	R	r
115	73	S	s
116	74	T	t

Code		Character	
Dec.	Hex.	Keyboard	Video Display
117	75	U	u
118	76	V	v
119	77	W	w
120	78	X	x
121	79	Y	y
122	7A	Z	z
123	7B	{	{
124	7C	CTRL-0	
125	7D	}	}
126	7E	CTRL-6	~ ±
127	7F		
128	80		␣
129	81		␣
130	82		␣
131	83		␣
132	84		␣
133	85		␣
134	86		␣
135	87		␣
136	88		␣
137	89		␣
138	8A		␣
139	8B		␣
140	8C		␣
141	8D		␣
142	8E		␣
143	8F		␣
144	90		.
145	91		.
146	92		.
147	93		.
148	94		.
149	95		.
150	96		-
151	97		-
152	98		-
153	99		-
154	9A		-
155	9B		-
156	9C		-
157	9D		-
158	9E		-
159	9F		↑
160	A0		␣
161	A1		!
162	A2		"

Code		Character	
Dec.	Hex.	Keyboard	Video Display
163	A3		#
164	A4		\$
165	A5		%
166	A6		&
167	A7		'
168	A8		(
169	A9)
170	AA		*
171	AB		+
172	AC		,
173	AD		-
174	AE		.
175	AF		/
176	B0		Ø
177	B1		1
178	B2		2
179	B3		3
180	B4		4
181	B5		5
182	B6		6
183	B7		7
184	B8		8
185	B9		9
186	BA		:
187	BB		;
188	BC		{
189	BD		=
190	BE		}
191	BF		?
192	C0		@
193	C1		A
194	C2		B
195	C3		C
196	C4		D
197	C5		E
198	C6		F
199	C7		G
200	C8		H
201	C9		I
202	CA		J
203	CB		K
204	CC		L
205	CD		M
206	CE		N
207	CF		O
208	D0		P

Code		Character	
Dec.	Hex.	Keyboard	Video Display
209	D1		Q
210	D2		R
211	D3		S
212	D4		T
213	D5		U
214	D6		V
215	D7		W
216	D8		X
217	D9		Y
218	DA		Z
219	DB		[
220	DC		\
221	DD]
222	DE		^
223	DF		_
224	E0		,
225	E1		a
226	E2		b
227	E3		c
228	E4		d
229	E5		e
230	E6		f
231	E7		g
232	E8		h
233	E9		i
234	EA		j
235	EB		k
236	EC		l
237	ED		m
238	EE		n
239	EF		o
240	F0	Unused	
241	F1	Unused	
242	F2	Unused	
243	F3	Unused	
244	F4	Unused	
245	F5	Unused	
246	F6	Unused	
247	F7	Unused	
248	F8	Unused	
249	F9	Unused	
250	FA	Unused	
251	FB	Unused	
252	FC		Moves cursor left
253	FD		Moves cursor right
254	FE		Moves cursor up
255	FF		Moves cursor down

APPENDIX E / Graphics Codes

00	01	02	03	04	05	06	07
08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	14	15	16	17
18	19	1A	1B	1C	1D	1E	1F

APPENDIX F / MODEL 16 & ENHANCED MODEL II SPECIFICATIONS

SPECIFICATIONS

The Radio Shack TRS-80 Model 16 and Enhanced Model II are disk-based computer systems with two major components:

1. A Display Console with up to two built-in, double-sided, double-density floppy disk drives (Model 16) or one built-in, single-sided floppy disk drive (Enhanced Model II).
2. A separate keyboard enclosure which can be positioned for maximum operator comfort and efficiency.

The operating system software is loaded from a system diskette in Drive 0 or Drive 4 by a built-in ROM "bootstrap" program.

PROCESSORS

Input/Output Processor System:

- . Z80-A based with 64K bytes of random access memory
- . Independent bus can support all the standard system boards
- . Emulation mode allows you to execute programs previously developed for the TRS-80 Model II without changing them first.

Computational Processor System:

- . 68000 based with either 128K or 256K (384K or 512K bytes on a Model 16) of RAM
- . Independent bus can support multiple bus masters

The two processors share the computing load from the application programs (the Z80-A based processor performs input/output tasks while the 68000 based processor performs computational tasks).

VIDEO DISPLAY

LSI Controller Chip:

- . Frees the input/output (Z80-A based) processor from much of the overhead required to update and maintain the video display.

Four Modes:

- . Model 16:
 - . green on black (normal)
 - . black on green (reversed)
 - . 80 characters by 24 lines
 - . 40 characters by 24 lines
- . Enhanced Model II:
 - . white on black (normal)
 - . black on white (reversed)
 - . 80 characters by 24 lines
 - . 40 characters by 24 lines

Displayable Characters:

- . Full ASCII set
- . 32 graphics characters

KEYBOARD

- . LSI Controller frees the input/output (Z80-A based) processor from keyboard scan and related tasks
- . Located in separate case for convenience
- . Connected to Display Console via a built-in cable exiting the bottom front of the Console
- . Standard typewriter keys, repeat key and two general-purpose function keys
- . Four modes: 1) Unshift; 2) Shift; 3) Caps; 4) Control

FLOPPY DISK DRIVES

Minimum:

- . Model 16: One (if system contains a hard disk) or two built-in 8" double-sided floppy disk drives
- . Enhanced Model II: One built-in 8" single-sided floppy disk drive

Maximum:

- Model 16: Two built-in and two external 8", double-sided floppy disk drives
(Disk Expansion Unit needed for two external drives)
- Enhanced Model II: One built-in and three external 8" single-sided floppy disk drives
(Disk Expansion Unit needed for three external drives)

Storage Capacity:

- 1,256,704 bytes per double-sided diskette (for User Data Capacity, see Operating System Manual)
- 625,920 bytes per single-sided diskette (for User Data Capacity, see Operating System Manual)

Diskette Organization:

- 154 tracks per double-sided diskette, 77 tracks per single-sided diskette
- 32 (0-31) sectors per track -- will vary with operating system software. See TRSDOS Reference Manual, Technical Information section for more details.
- 256 bytes per sector (except track 0 which has 128 bytes per sector) -- varies with operating system software. See TRSDOS-16 and the TRSDOS/Model II Reference Manuals, Technical Information sections for more details.

Data Transfer Rate:

- 500,000 bits per second (except track 0 which has 250,000 bps)

Required Media:

- Model 16: Radio Shack Double or Single-sided, 8" Floppy Diskettes
- Enhanced Model II: Radio Shack Single-sided, 8" Floppy Diskettes

Preventative Maintenance Interval:

- Typical usage (3,000 Power-on hours per year):
Every 8000 Power-On Hours
- Heavy usage (8,000 Power-on hours per year):
Every 5000 Power-On Hours

Diskette Life:

- . 3.5 million passes per track
- . Usually limited by improper handling. Follow handling recommendations for maximum use.

POWER SUPPLY

Power Requirements:

- . 105 - 130 VAC, 60 Hz
- . 240 VAC, 50 Hz (Australian)
- . 220 VAC, 50 Hz (European)
- . Grounded outlet

Maximum Current Drain:

- . 2.0 Amps

Typical Current Drain:

- . 1.5 Amps

OPERATING TEMPERATURE

- . 32 to 110 degrees Fahrenheit
- . 0 to 43 degrees Centigrade

PERIPHERAL INTERFACES

Standard:

- . Serial port A (RS232-C)
- . Serial port B (RS232-C)
- . Parallel input/output channel, for connection to TRS-80 standard parallel interface line printers
- . Floppy disk input/output channel for connection of a Disk Expansion Unit

Optional:

- . Hard Disk Drive Interface
- . ARCNET Interface
- . Graphic Board

Serial Interface

Two Channels

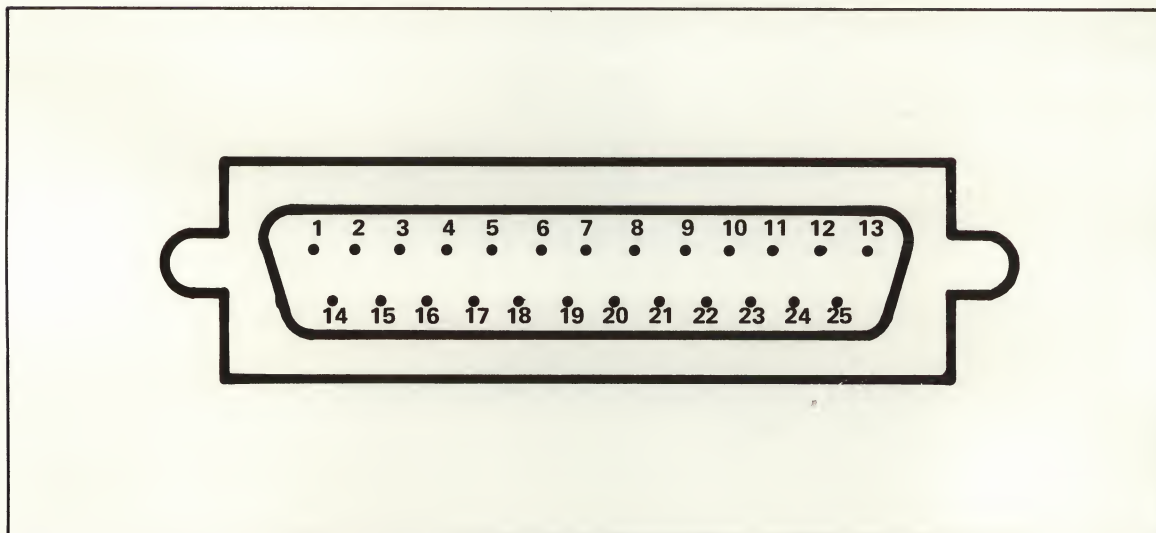
- . Channel A allows asynchronous or synchronous

transmission.

- . Channel B allows asynchronous transmission only.
- . Both conform to the RS-232-C standard.
- . Both use the DB-25 connectors on the back of the Display Console.

The DB-25 connector pin-outs and signals available are listed below.

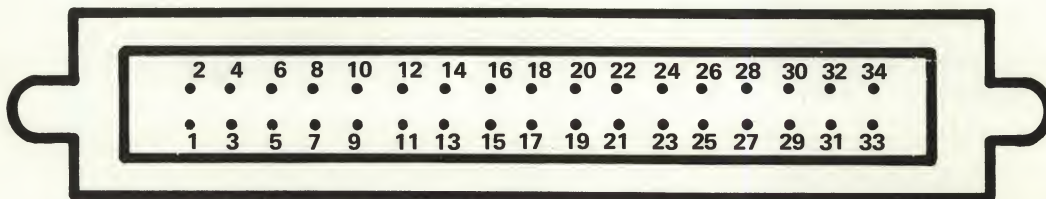
CHANNEL A		CHANNEL B	
STANDARD	PIN #	STANDARD	PIN #
RS-232C SIGNAL		RS-232-C SIGNAL	
I/O TRANSMIT S.E.T.	15	GROUND	1,7
GROUND	1,7	RECEIVED DATA	3
RECEIVED DATA	3	RECEIVER XMITTER CLOCK	17
RECEIVER CLOCK	17	DATA SET READY	6
TRANSMIT CLOCK	24	CLEAR-TO-SEND	5
DATA SET READY	6	CARRIER DETECT	8
CLEAR-TO-SEND	5	TRANSMIT DATA	2
CARRIER DETECT	8	REQUEST-TO-SEND	4
TRANSMIT DATA	2	DATA TERMINAL READY	20
REQUEST-TO-SEND	4		
DATA TERMINAL READY	20		



Parallel Interface

- . Connection to a line printer via the 34-pin connector on the back panel of the Display Console.
- . Eight data bits are output in parallel.
- . Four data bits are input.
- . All levels are TTL compatible.

The connector pin-outs and signals available are listed on the next page.



SIGNAL	FUNCTION	PIN
STROBE	1 microsecond pulse to clock the data from processor to printer	1
DATA 0	Bit 0 (lsb) of output data byte	3
DATA 1	Bit 1 of output data byte	5
DATA 2	Bit 2 of output data byte	7
DATA 3	Bit 3 of output data byte	9
DATA 4	Bit 4 of output data byte	11
DATA 5	Bit 5 of output data byte	13
DATA 6	Bit 6 of output data byte	15
DATA 7	Bit 7 (msb) of output data byte	17
ACK*	Input to Computer from Printer, low indicates data byte received	19
BUSY	Input to Computer from Printer, high indicates busy	21
PAPER EMPTY	Input to Computer from Printer, high indicates no paper -- if Printer doesn't provide this, signal is forced low	23
SELECT	Input to Computer from Printer, high indicates device selected	25
PRIME*	Output to Printer to clear buffer and reset printer logic	26
FAULT*	Input to Computer from Printer low indicates fault (paper empty, light detect, deselect, etc.)	28
GROUND	Common signal ground	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 27, 31, 33
NC	Not connected	29, 30, 32, 34

*These signals are active-low.

APPENDIX G / SVC Quick Reference List

NAME	DESCRIPTION	NO.
=====	=====	=====
ACTL	Control Channel A	100
-----	-----	-----
ARCV	Channel A Receive	96
-----	-----	-----
ATX	Channel A Transmit	97
-----	-----	-----
BCTL	Control Channel B	101
-----	-----	-----
BRCV	Channel B Receive	98
-----	-----	-----
BTX	Channel B Transmit	99
-----	-----	-----
CLOSE	Terminates output to specified file.	42
-----	-----	-----
CLOSEF	Terminates output to all open files except OPENDO file	133
-----	-----	-----
CLRXT	Clear user memory and jump to TRSDOS-16 Ready	257
-----	-----	-----
CURSOR	Position cursor	10
-----	-----	-----
DATE	Returns the real-time (time/date)	45
-----	-----	-----
DEBUG	Load the Debugger	259
-----	-----	-----
DIRRD	Allows a specific record in a FLR file to be read.	35
-----	-----	-----
DIRWR	Allows a specific record in a FLR file to be read.	44
-----	-----	-----
DISMOUNT	Logically disconnect a MOUNTed disk device	139
-----	-----	-----
DOSCMD	Execute TRSDOS-16 command and return to TRSDOS-16 Ready	270
-----	-----	-----
DUMP	Writes a 68000 format program file from 68000 memory.	130
-----	-----	-----
ERRMSG	Returns an 80-byte descriptive error message for the requested error number	52
=====	=====	=====

NAME	DESCRIPTION	NO.
=====	=====	=====
ERROR	Causes the error message referred to by ERROR NUMBER to be printed on the video display.	39
-----	-----	-----
EXECUTE	Execute program.	263
-----	-----	-----
HLDKEY	Enable / Disable HOLD key.	29
-----	-----	-----
JP2DOS	Jump to TRSDOS-16 Ready.	264
-----	-----	-----
KBCHAR	Strobes the keyboard and returns with or without a character.	4
-----	-----	-----
KBINIT	Initializes the keyboard input driver.	1
-----	-----	-----
KBLINE	Inputs a line from the keyboard into a buffer and echoes the line to the display.	5
-----	-----	-----
KILL	Deletes the specified file from the directory.	41
-----	-----	-----
LOAD	Loads a 68000-format program into the user memory.	131
-----	-----	-----
LOCATE	Returns the number of the current record. (i.e. the last record accessed)	33
-----	-----	-----
MOUNT	Logically connects a disk device	138
-----	-----	-----
MOVBUF	Retrieves and stores an 80-byte buffer	267
-----	-----	-----
OPEN	Handles both the creation and opening of files.	40
-----	-----	-----
OPENDO	Opens and creates a special file not closed by CLOSEF	140
-----	-----	-----
PRCHAR	Sends one character to the Printer.	18
-----	-----	-----
PRCTRL	Lets you select various printer options.	95
-----	-----	-----
PRINIT	Initializes the printer driver	17
=====	=====	=====

NAME	DESCRIPTION	NO.
PRLINE	Sends a line to the Printer.	19
READNX	Reads the next record after the current record.	34
RENAME	Changes the name and/or extension of a file	47
RESET	Same as pressing the RESET switch	129
RS232C	Initialize RS-232C Channel	55
SETBRK	Enable / Disable the BREAK key	269
SETTRP	Set or remove trap vectors	266
UNLOCK	Unlocks a specified record	136
VDCHAR	This routine outputs a character at the current cursor position.	8
VDINIT	Initialize the Video Driver	7
VDLINE	Writes a buffer of data to the display	9
VERSION	Get version of Operating System	137
VIDKEY	Sends a prompting message to the display and then waits for a line from the keybd.	12
WRITNX	Writes the next record after the last record accessed. (i.e., sequentially)	43

INDEX

	Page
ABS	27, 34, 48, 52, 71, 74
Access Password	15
ACTL	79, 122, 129-130
Addresses	
Base Address	105, 106, 107, 238
Bounds Address	238
Buffer Address	128, 212
Dump Address	156
High Bound Address	170
Low Bound Address	170
Parameter List Address	177, 199
Start Load Address	170
Transfer Address	170, 202
ALL	48, 72, 74
Alternate Directory	53
APPEND	25, 29, 51
ARCV	79, 122, 131
ASCII	59, 84, 145
Character Codes	239-244
Text File	116
Assembler	105
ATTRIB	15, 25, 29-31, 51
ATX	79, 122, 133-134
AUTO	12, 25, 31-32
Auto File	237
Auto Line Feed	187, 188
Auto Sign-On	88, 92
Background Printing	82, 185
BACKUP	25, 32, 68, 73
Base Address	105, 106, 107, 238
BASIC	65
Baud Rate	79, 80, 85, 86
BCTL	79, 122, 135-136
BLOCK	123
BOOT16 TRSDOS16/SYS	12
Bounds Address	105, 107, 238
Braces { }	27
BRCV	79
BRCV	122, 137
<BREAK>	12, 64, 87-90, 164, 202
Break Character/Sequence	87, 88
BTX	79, 122, 139-140
Buffer	114, 127, 155, 175
address	128, 212
BUILD	76
Byte	108, 112, 123
Byte-Offset	123, 124, 126, 127
Capture-File	82, 83
Character Transmitted Status	133, 139

INDEX

	Page
CLEAR	25, 33
CLOSE	122, 141
CLOSEF	122, 142, 180
CLREXIT	122, 143
CLS	18, 25, 26, 33
COBOL	35
Codes	
Access Code	177, 180
ASCII Character Codes	239-244
Communications Status	130, 131, 133, 135,
Code	138, 139
Creation Code	177, 181
Error Code	177
Graphics Code	245
Column	144
Command File	18, 105
Command Syntax	26-28
Comment	27
Communications Status Code	130, 131, 133, 135,
	138, 139
Compilers	29
Completion Errors	234, 236
Configuration	105
Errors	234, 235
Command File	12, 147, 232
Configurator	
Error Messages	234-236
CONFIG16/SYS	12, 232, 233, 237
COPY	25, 27, 34, 35, 51
CREATE	25, 35, 36, 51, 113
Cylinders	108
Data Files	64, 65, 66, 69, 90, 91,
	97
DATASET	72, 74, 75
DATE	18, 25, 36
DATE SVC	127, 145-146
DB-25 Connector Pin-Outs	250
(DC) Date Created	74, 77
DEBUG	26, 122, 147, 232, 234
Debugger	147, 238
DELETE	69
Diagnostics	110
DIR	17-20, 25, 31, 37-39
Direct File Access	119
Directory	14, 58, 169
Alternate Directory	110, 111
Primary Directories	110, 111
Space Formula	110
DIRRD (Direct-Read)	119, 121, 122, 149-150,
	206
DIRWR (Direct-Write)	119, 121, 122,
	123, 151-152

INDEX

	Page
Disk	6
Disk capacity	
Double-Sided Diskette	108
Hard Disk	108, 109
Single-Sided Diskette	108
Diskette	6
Diskette Swap	61
Disk Files	14, 18, 19, 48, 57, 63, 81, 82, 113, 118, 141
Disk I/O	128
<u>disk name</u>	16, 38
Disk Organization	108
Disk Read/Write Mechanism	57
Disk Sectors	56
Disk Space Allocation	112
Double-Sided diskette	112
Hard Disk	112
Single-Sided diskette	112
DISMOUNT	21, 25, 39-40, 61, 122, 153, 173
(DM) Date Modified	74, 77
DO	25, 28, 40-41, 51
Do-file	18, 19, 28, 32, 142, 143, 163
DOSCMD	122, 155
Double-Sided Diskette	32, 52
<u>drive</u>	15
DRIVE	41-46
Drive Settings	
RATE	42, 43, 44
DETECT	42, 43, 44
NODETECT	42, 43, 44
WAIT	42, 43, 44
NOWAIT	42, 43, 44
OFFLINE	42, 45, 46
ONLINE	42, 45, 46
DUAL	190
Dummy Modes	56
Dummy Output Mode	187, 188
DUMP	46-47, 51, 97, 122, 156-157
Dump Address	156
Editor	14, 40, 105
EDIT16	14, 18, 40, 232, 233
Emulation Mode	246
Emulators	205
ERRMSG	122, 127, 158
ERROR	122, 126, 159
Error-Code	124
Error Conditions	66, 139
Error Messages	158, 221

INDEX

	Page
-----	-----
Boot Errors	221, 228
Operating System Errors	221, 222
Application Program Errors	221
EXEC	26, 47-48
EXECUT	122, 160
extension (<u>/ext</u>)	14, 70
extents	57
FCOPY	17, 18, 25, 48-50
FCOPY DIR	49
Fields	145
File Access	122
File Allocation	
Dynamic Allocation	113
Pre-Allocation	113
File Fragmentation	56-57
File Identification Number	124, 125-126, 141, 150, 172, 177-178, 180, 182, 194, 206, 217
<u>filename</u>	14, 38, 70
<u>FILES</u>	50-51
<u>filespec</u>	14, 16
First-In, First-Out buffer (FIFO)	131, 137
Fixed length Record (FLR)	29, 38, 63, 91, 116, 119, 149, 151, 172
Flags	138, 139
Wait For Character	164
Character Present	164
Returned Character	164
FLOPPY	51-52
Floppy Diskette	71, 73, 108
Single-Sided	108
Double-Sided	108
Double Density	108
Swap	173
Floppy Disk Drives	41, 42, 43, 60, 247-249
Latch	42-45
Push button	42-45
Thinline	42-45
Floppy Disk System	11
FORMAT	52-54, 68
FORMS	54-56, 86, 92
Format Options	54-55
Parameters	55
Switch Options	55-56
FREE	56-57
Function Code	122, 124, 126
Graphics Code	245
Hard Disk	5, 73, 112, 153
Drives	42

INDEX

	Page
-----	-----
System	11, 73
HELP	58
Hexadecimal Codes	67
Hexadecimal Number	47
HLDKEY	122, 161-162
<HOLD>	161
Illegal OpCodes	205
Indexed Access Files(ISAM)	29
INDirect (IND)	71-72, 74, 76-77
Input Buffer	131-132, 137-138, 167
Input/Output Processor System	246
Instruction Address	147
Interactive Terminal Mode	84, 87-90
Error Messages	98
P	99
O	99
F	99
DATA CARRIER LOST	99
DATA CARRIER RESTORED	99
DATA SEQUENCE RECEIVED	99
Interrupt Handlers	127
Interrupts	237
JP2DOS	122, 163
KBCHAR	122, 164-165
KBINIT	122, 166
KBLINE	122, 167-168, 215
Key-Ahead Buffer	164, 166
Keyboard	122, 247
Buffer	164
Input Driver	166
KILL	18, 51, 58-59, 122, 128, 169
LIB	13, 59
Linker	105
LIST	51, 59-60
LOAD	51, 60, 122, 170-171
LOCATE	121, 122, 172
Logical Record Length	118
Long Word	123
Machine Language Object Code	84
Machine Language Programs	60, 64-65, 70, 78
Master Password	68
MC68000	1
Memory	
Memory Addresses	123
Memory Chart	107
Memory Map	238
Memory Requirements	105
Menu Mode	84-86

INDEX

	Page
-----	-----
Model II Mode	1, 11, 48
Modem	78, 84
Modulo 24	144
MOUNT	21, 60-61, 122, 173-174
MOVBUF	122, 155 175-176
MOVE	18, 51, 61-62
MSG	18
Normal Mode	188
Notations	5
OPEN	51, 122, 177-179
OPENDO	122, 180-182, 198
Operating System	1, 3, 214
Routines	122
Parameters	26, 123, 175
Errors	124
List Address	180
Parity	79-80, 85-86
Partition	204
<u>password</u>	15, 63, 68, 69
PATCH	63-66
Patch Level	214
PAUSE	67
PC Register Set	147
Peripheral Interfaces	249-252
Physical Load Address	106
Power Supply	249
PRCHAR	122, 183-184, 192
PRCTRL Supervisor Call	56, 122, 185-186
Pre-Allocation	113
Primary Directory	53
Primary Disk Device	232
Primary Drive	6, 13, 17, 50, 69
PRINIT	122, 189-191
PRINT	67-68
Print-File	82
Printer's Buffer	183, 192
Printer Output	82
PRLINE	122, 128, 192-193
Program Files	64
Programming With User Interrupts	127
PROMPT	48, 71, 74
PROT	68-69
Protection level	30
PRT	37, 50, 56, 59, 71
PURGE	69-70
RAM	65
RAM Buffer	47
Random Access	119
READNX (Read-Next)	119-120, 122, 194-195,

INDEX

	Page
Record	206
Address	114
Length	124-126, 149, 151, 194
Logical Records	38, 114
Numbers	114
Physical Records	118, 124-126, 149-151,
Processing	172, 206, 217
Record Lock Flag	114
Relative Addressing	119
Relocation Address	149, 194
RENAME	105-106
Reserved	156
RESET	51, 70, 77, 122, 128,
RESTORE	196-197
Row	107, 124
RS-232C	70, 122, 198
Cable	71-73
Parameters	144
RTR Instruction	78, 122, 129, 131,
RUNCOBOL	199-201
SAVE	84, 85
DIRectory	199
Sectors	127
Secondary Drives	105, 232
Sequential File Access	71-75, 77
Sequential Read	76
Sequential Write	39, 108-109, 111-115
Serial Channel	42, 43, 46
SETBRK	119
SETCOM	120
SETTRP	121
Single-Sided Diskette	78, 80, 84-86, 129,
68000	131, 133, 135, 137,
Operating System	139, 250
Processor	122, 127, 164, 202-203
Program	78-80, 86
SIZE	122, 127, 204-205
Spanning	32, 52
Specifications	12
SPOOL	237
SPOOL File	13, 65, 156, 170
Capture Function	80
Stack Pointer	114
Status Bits	246
Status Registers	80-84, 185
Stop Bits	142
	185
	127
	125
	127
	79-80, 85-86

INDEX

	Page
Supervisor Calls (SVCs)	119, 122-123, 126-127
BLOCK	123-126
Calling Procedure	125-126
Number	124
Quick Reference List	253-255
Swap Diskettes	21
Switch	
Character Size Switch	210
Normal/Reverse Switch	210
Syntax	58
SYS	37, 49, 50, 69, 72, 74
System Commands	12, 29-103
System Diskette	32
System Files	37
System Trap	127
T	83-84
TERMINAL	84-101
Error Conditions	98-101
P	
O	
F	
DATA CARRIER LOST	
DATA CARRIER RESTORED	
BREAK SEQUENCE RECEIVED	
Terms	5
TEST	125
Text Buffer	212
TIME	99
Tracks	108, 110-112
Transfer Address	156
Transparent Mode	56, 187-188
Trap	205, 237
Trap Vector	204
UNLOCK	122, 206-207
Update Password	15
Update	38
User	
Attribute	178, 181-182
Attribute Byte	178, 181-182
File	61
Memory	33, 80, 105, 107, 127, 143, 170, 238
PC	127
Stack	127
Variable Length Record (VLR)	29, 38, 91, 116, 119, 121, 147, 151
VDCHAR	122, 208-209
VDINIT	122, 210-211
VDLINE	122, 128, 212-213, 215
Vectors	205

INDEX

	Page
-----	-----
Verification	53
Address	205
VERIFY	100
VERSION	100, 122, 214
Major Version Level	214
Minor Version Level	214
Video Display	122, 247
VIDKEY	122, 215-216
VOLUME	72, 74-75
Wildcarding	75
Wildcards	
Wildcard (*)	17,18,20,50,61
Super Wildcard (!)	17,18,20, 50, 61
Word	123
Word Length	79-80, 85-86
WRITNX (Write-Next)	119-120, 122, 217-218
Z80	1
Z-80 Program File	64

RADIO SHACK A DIVISION OF TANDY CORPORATION

**U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5**

TANDY CORPORATION

AUSTRALIA

**280-316 VICTORIA ROAD
RYDALMERE, N.S.W. 2116**

BELGIUM

**PARC INDUSTRIEL DE NANINNE
5140 NANINNE**

U. K.

**BILSTON ROAD WEDNESBURY
WEST MIDLANDS WS10 7JN**